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Written on APRIL 6, 2015 AT 6:15 AM bySVANDERWERFF

NAMRU-3 Cairo's Virology Program : Monitoring and studying disease threats in CENTCOM and AFRICOM Part 1

Filed under COMMUNICATION, HUMANITARIAN ASSISTANCE AND DISASTER RELIEF, OPERATIONS (NO COMMENTS)



My department focuses on viral infectious tropical diseases.

By Lt. Cmdr. Gabriel Defang

I'd like to discuss NAMRU-3's Viral and Zoonotic Disease Research Program, aka the Virology Program. Our mission is to study, monitor and detect emerging and reemerging disease threats of importance to the U.S. military and public health.

My department focuses on viral infectious tropical diseases. We are well placed in Egypt to conduct studies in West Africa, Horn of Africa (AFRICOM), and the Middle East (CENTCOM).

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The U.S. military has been engaged in tropical diseases research since WWII because our Soldiers, Sailors, Marines and Airmen often operated in tropical climes. Our role is to study these endemic infectious diseases and develop new drugs and vaccines. Our scientific research has a great public health upside. By executing our mission, our host nations also benefit. Many of the nasty disease threats we face are viral in nature, and most of these emerging viruses arise from the interface between animals and humans (zoonotic diseases) – hence, the “Viral” and “Zoonotic” in the department’s name.



Since WWII our Soldiers, Sailors, Marines and
Airmen often operated in tropical climes.

Viruses that we study include Middle Eastern Coronavirus (MERS-CoV), Rift Valley Fever (RVF), Crimean-Congo Hemorrhagic Fever Virus (CCHF), influenza – including avian influenza and more recently, Ebola virus. The last four are considered dangerous pathogens and must be handled in a biosafety level 3 enhanced containment laboratory such as the one we operate in Cairo. Dengue, RVF and CCHF are vector borne diseases, therefore, we work closely with NAMRU-3's Vector Biology Research Program, to track these viruses in mosquitoes and ticks in endemic environments and animal populations.

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So how do we go about studying these pathogens? Well, first we must identify and isolate the disease agent. To do this, we have set up surveillance networks in several partner countries including Burkina Faso, Togo, Cote d'Ivoire, Ghana, Yemen, Jordan and Egypt. We work closely with military and civilian medical personnel in these countries. Important disease incidence and prevalence data that is captured, allows for the testing of new vaccines and drugs.

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A surveillance that we manage is the influenza surveillance, which became critically important after the 2009 pandemic flu event. Through this year-round exploration, we identify and isolate circulating flu strains, and monitor changes in their genetic composition that may allow escape or resistance from current vaccines or available drugs such as oseltamivir. We provide this information twice a year to the Department of Defense (DoD),

Centers for Disease Control and Prevention (CDC), and the World Health Organization (WHO). They in turn use information from DoD to select flu vaccines and drugs for the upcoming year. Our activities in this domain and our regional reach has allowed us to serve as a WHO collaborating center and Avian Influenza (A/H5N1) reference laboratory.



Currently, we are experiencing a significant spike in A/H5N1 cases in Egypt. It is worse than "swine" flu.

Currently, we are experiencing a significant spike in A/H5N1 cases in Egypt. It is worse than "swine" flu. One in three infected people will die from it, but it's generally thought to be difficult for humans to be infected. You have to be in close contact with poultry to get it. We do have a lot of poultry here. However, Egypt normally experiences 4 -40 cases a year, but get this: in the first three months of 2015, we've had 116 cases. This is an anomaly that has drawn global attention. We've been working in collaboration with the WHO and CDC to explain the current surge in cases. We've sequenced a few of the viruses from recent cases, but need to do more studies to understand what factors are driving the current outbreak. As you can see, there is always an emerging or reemerging disease threat that the virology program staff members have to tackle. In my next blog, I'll tell you more about what we do, including our work on another relatively new respiratory virus that emerged in the Arabian Peninsula a few years ago. Stay tuned.

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Written on APRIL 13, 2015 AT 6:00 AM by SVANDERWERFF

NAMRU-3 Cairo's Virology Program : Monitoring and studying disease threats in CENTCOM and AFRICOM Part 2

Filed under FLEET AND THE FLEET MARINE FORCE, FORCE HEALTH AND SAFETY, HEATH (ONE COMMENT)

By Lt. Cmdr. Gabriel Defang



The most amazing thing about our program is the staffs who accomplish the day-to-day mission. NAMRU-3 is both Egyptian and American, active duty and civilian scientists and lab technologists working side-by-side in collaboration with our colleagues from partner countries.



As I promised in my last blog I'm going to tell you more about our virology program activities and about another fairly new virus we've been working on.

You may have heard of this novel virus, it is called MERS-CoV; which stands for "Middle East Respiratory Syndrome Coronavirus" (quite a long name). It emerged in the Middle East in 2012 and kills one in three people it infects. All known cases are either Middle East residents or have a history of travel to the region. Camels and bats are thought to be reservoirs of the virus, but more research needs to be done regarding this aspect.

Because of the disease surveillance networks we've had in place in the region, we were able to identify and isolate this virus earlier on. We were one of a handful of groups to successfully grow the virus in tissue culture, as well as generate a full genome sequence of the virus. As a matter of fact, the virus we isolated is now known to be the earliest form of the virus that emerged in 2012. Isn't this amazing? It's a feather in our cap, for sure.

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After NAMRU-3 participated in the Navy's Ebola response efforts in Liberia, we are now training Liberians to perform Ebola diagnostics by themselves; so next time this ugly disease rears its head Liberians will be able to easily detect it and quickly notify the global community.

We are currently working on new diagnostics and therapies for this virus. One such therapy is a fully human anti-MERS-CoV plasma product collected from genetically-engineered cows vaccinated with MERS-CoV. These cows produce large amounts of human antibodies that are eventually purified. This product will need to be tested in clinical trials. If successful, it could be used to treat people infected in the region.

We also do disease surveillance for pathogens that cause fever (a lot you would imagine), and we develop and optimize new field diagnostic analyses to detect these pathogens more efficiently and consistently. We've had much success in this realm; detecting RVF when it was introduced in Egypt in the 70's and again in the 90's, identifying CCHF in clusters in Afghanistan and Mauritania, Dengue in Sudan and Burkina Faso, MERS-CoV in Jordan and Lebanon. We transfer this technology to partner countries for public health strengthening through lab capacity building and training efforts. In this way, we empower partner countries to act as first line of defense for new and reemerging public health threats. With the world so interconnected, these efforts go a long way in achieving global health security. Case in point: after NAMRU-3 participated in the Navy's Ebola response efforts in Liberia, we are now training Liberians to perform Ebola diagnostics by themselves; so next time this ugly disease rears its head Liberians will be able to easily detect it and quickly notify the global community.



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We empower partner countries to act as first line of defense for new and reemerging public health threats

The most amazing thing about our program is the staffs who accomplish the day-to-day mission. NAMRU-3 is both Egyptian and American, active duty and civilian scientists and lab technologists working side-by-side in collaboration with our colleagues from partner countries. It's an awesome job. If you have a chance to be stationed or to visit NAMRU-3 Cairo, Egypt, I say take the opportunity. You'll love the experience. If you'd like to know more about what we do, just send us your questions.

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Ludwig Mantay
I was wanting to get back in touch with some of my former Egyptian coworkers. Could you help with that? I was the Virology Department LPO from 1988 to 1990.

